

What is claimed is:

1 1. A mounting structure of a semiconductor device
2 comprising:

3 a semiconductor chip which is provided with a plurality
4 of solder balls;

5 a wiring substrate which is provided with a plurality
6 of connection pads; and

7 an insulating sheet which has a plurality of leads and
8 which is provided between said semiconductor chip and said
9 wiring substrate,

10 wherein said plurality of solder balls are electrically
11 connected through said leads to corresponding ones of said
12 connection pads, respectively

1 2. The mounting structure of a semiconductor device as
2 claimed in claim 1,

3 wherein said insulating sheet has holes therethrough
4 at positions corresponding to those of said connection pads.

1 3. The mounting structure of a semiconductor device as
2 claimed in claim 2,

3 wherein one end of each of said leads is fixed on a first
4 surface of said insulating sheet while the other end of each
5 of said leads is shaped to be inserted in the corresponding
6 one of said holes.

1 4. The mounting structure of a semiconductor device as

Sul
c23

09788596 022101

2 claimed in claim 3,
3 wherein the other end of each of said leads protrudes
4 from a second surface of said insulating sheet through the
5 corresponding one of said holes.

1 5. The mounting structure of a semiconductor device as
2 claimed in claim 4,
3 wherein each of said solder balls of said semiconductor
4 chip is electrically connected to said fixed one end of a
5 corresponding one of said leads.

1 6. The mounting structure of a semiconductor device as
2 claimed in claim 4,
3 wherein each of said connection pads is electrically
4 connected to said other end of a corresponding one of said leads.

1 7. The mounting structure of a semiconductor device as
2 claimed in claim 4,
3 wherein said leads are formed of a resilient conductive
4 material.

1 8. The mounting structure of a semiconductor device as
2 claimed in claim 4,

3 wherein the gap between said insulating sheet and said
4 wiring substrate is filled with resin.

1 9. The mounting structure of a semiconductor device as
2 claimed in claim 4,

09788596 022101
TOTAL 9688760

Sub
C3

3 wherein said insulating sheet is made of any one of
4 polyimide resin, Teflon resin, epoxy resin, and alumina resin.

1 10. A mounting method of a semiconductor device for
2 mounting a semiconductor chip provided with a plurality of
3 solder balls on a wiring substrate provided with a plurality
4 of connection pads, comprising:

5 providing an insulating sheet having holes
6 corresponding to said connection pads and having a plurality
7 of leads, one end of each of said leads being fixed on a first
8 surface of said insulating sheet and the other end of each of
9 said leads protruding from a second surface of said insulating
10 sheet through one of said holes;

11 electrically connecting said other end of each of said
12 ~~leads of said insulating sheet~~ to a corresponding one of said
13 connection pads; and

14 electrically connecting each of said solder balls to
15 said fixed one end of a corresponding one of said leads.

1 11. The mounting method of a semiconductor device as
2 claimed in claim 10, further comprising:

3 filling resin into the gap between said insulating
4 sheet and said wiring substrate after said connecting said other
5 end of each of said leads to a corresponding one of said
6 connection pads.

1 12. An insulating sheet provided between a semiconductor
2 chip and a wiring substrate comprising:

09788596-022101

3 a plurality of holes therethrough; and
 4 a plurality of leads, one end of each of said leads being
 5 fixed on a first surface of said insulating sheet and the other
 6 end of each of said leads being shaped to be afloat in said holes.

1 13. The insulating sheet as claimed in claim 12, wherein
 2 said other end of each of said leads protrudes from a second
 3 surface of said insulating sheet through one of said holes.

1 14. The insulating sheet as claimed in claim 13,
 2 wherein said fixed one end of each of said leads is
 3 connected to a corresponding one of a plurality of solder balls
 4 of said semiconductor chip, and said other end of each of said
 5 plurality of leads is connected to a corresponding one of a
 6 plurality of connection pads of said wiring substrate.

1 15. A method of manufacturing an insulating sheet provided
 2 between a semiconductor chip and a wiring substrate comprising:
 3 providing a metal film on one surface of said insulating
 4 sheet;

5 masking and etching said metal film to form a plurality
 6 of leads;

7 cutting out predetermined places of said insulating
 8 sheet to provide a plurality of holes through said insulating
 9 sheet; and

10 making one end of each of said plurality of leads fall
 11 into a corresponding one of said holes.

09788596-022101

Sub
C4

1 16. A method of manufacturing an insulating sheet provided
2 between a semiconductor chip and a wiring substrate comprising:
3 cutting out predetermined places of said insulating
4 sheet to provide a plurality of holes through said insulating
5 sheet;
6 fixing one end of each of a plurality of leads onto said
7 insulating sheet; and
8 making the other end of each of said leads fall into
9 a corresponding one of said plurality of holes.

09788596-022101

ADD
C5Add
B1